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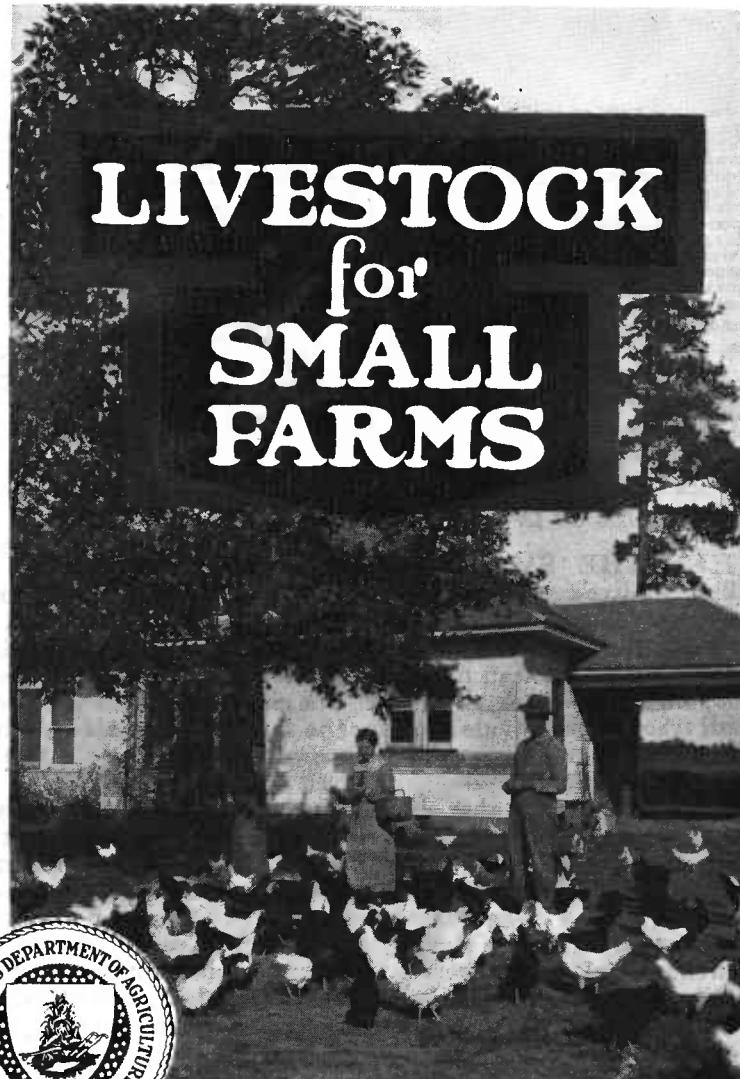
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LIVESTOCK for SMALL F FARMS



LIVESTOCK FOR SMALL FARMS

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KINDS OF LIVESTOCK RAISED ON SMALL FARMS

WHEN THE SMALL-TRACT OPERATOR considers the kind of livestock to raise most advantageously, in addition to the customary garden, he must take into consideration the initial cost of the stock, the availability and cost of feed, and the necessary labor involved. He will find in many cases that certain kinds of livestock are not suited for such small farms. The chief usefulness of livestock on small tracts is to provide food for the family and salable products, to utilize wastes, and also enable their owner to build up the fertility of his land with the manure.

Experience has shown that chickens or other poultry, rabbits, hogs, and in some cases milk goats or cows are best suited to the conditions of most small farms. Other kinds of livestock are handled more advantageously on larger farms. Although a horse or some kind of mechanical power will be needed for plowing, the owner of a small tract can usually hire this work done much more reasonably than he can purchase and feed a horse. The opportunity, however, to do odd jobs about the neighborhood, such as hauling, cultivating, or similar work, may sometimes justify keeping a horse or mule.

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CHICKENS

A poultry flock is undoubtedly an important adjunct to the operation of a small farm. A small flock, of 10 to 25 chickens, may be begun with a very moderate cash outlay. With proper care the birds will supply fresh eggs and meat at low cost, especially if there are sufficient table scraps to furnish part of the feed. Even a small home yard usually has ground enough to accommodate enough hens to supply eggs and table poultry for a small family. The manure may be used on the garden to reduce the cost of fertilizer. The flock may be developed into a source of cash income as there is usually a good local demand for fresh eggs and home-dressed poultry. In the average family there is usually someone who can devote enough time to the flock to maintain a fair production of eggs, and the heavy work may be done at intervals with the aid of other members of the family when they are not at work or in school. A building about 8 by 10 feet in ground dimensions, suitable for housing a small flock of 25 laying hens, may be built for as little as \$25 provided some or all of the materials can be obtained second-hand and some member of the family can do the construction work. If the farm is in a cold climate requiring a more substantial and warmly built house, the cost will be closer to \$35. Some additional outlay for fencing and for brood coops or brooders for the young chickens may be necessary.

ESTABLISHING A SMALL FLOCK

In selecting a breed the inclinations of the individual concerned can be readily satisfied since there are many suitable breeds. If the flock is to be kept primarily for the production of eggs, one of the lighter breeds, such as Leghorns, Anconas, or others, is advised. High fences are generally needed, however, to confine such birds because of their tendency and ability to fly. For those who prefer a breed that will produce high-class dressed poultry, one of the so-called "general-purpose" breeds is preferable. These include the Rhode Island Reds, Plymouth Rocks, Wyandottes, and Orpingtons. The so-called "heavy breeds", such as the Brahma and Jersey Giants, make large roasters but are not so popular for meat production as the general-purpose breeds. The general-purpose breeds are especially suitable for small flocks and, if the stock has been selected for egg production, the hens will lay well and also make good table fowls. Stock should preferably be from a flock that has been developed for high egg production. In any case, the stock should be from a purebred flock that is free from disease.

A desirable procedure for the person of limited means who wishes to establish a small flock of chickens is to purchase several settings of hatching eggs and a few broody hens to hatch the eggs. If only 10 or 15 laying hens are to be raised, the setting hens are likely to be more economical than the use of an incubator. Besides, they can be used also for brooding the chicks, thus saving the cost of brooding equipment.

Another method for the beginner, especially one who desires a larger flock of layers or who wants one of the varieties that do not become broody readily, is to purchase day-old chicks. The cost is

usually less than when one buys hatching eggs and a small incubator. A further advantage in buying or hatching chicks is getting them earlier than is usually the case when one must wait for hens to become broody in order to start the hatch.

When buying chicks or hatching with an incubator, it is necessary to brood the chicks artificially. Some poultrymen use home-made brooders successfully whereas others buy commercial ones. Any building that is to be used for a brooder house should be well built and free from drafts. It should be large enough to allow at least 1 square foot of floor space for each three chicks. The kind of heat to be used for the brooder stove is unimportant so long as there is no fire hazard. Electric incubators and brooders are very satisfactory and offer less fire risk than oil or coal machines. In case a portion of the main dwelling or a building near it is to be used, it is advisable to see whether the proposed use conforms with fire regulations and existing insurance policies.

One disadvantage of artificial brooding is the need for frequent attention in feeding and caring for the chicks while they are young. The beginner who prefers to avoid the expense and labor of brooding chicks may purchase 8-week-old pullets or even mature pullets that are ready to be placed in the laying house. Pullets of either kind, however, require more cash outlay than younger stock.

A recent development in the poultry industry is the perfection of a method of determining the sex of newly hatched chicks. It is now possible, therefore, to purchase so-called "sexed" chicks from commercial hatcheries at a price somewhat greater than for chicks of both sexes.

In order to have a flock of laying hens in the fall and winter to provide eggs for a small family, the beginner should hatch or buy at least 3 dozen chicks. This will allow for the loss of some chicks from accident or disease, and for some culling. Approximately 50 percent of the chicks will be cockerels which may be used for the table as they reach sufficient size and weight.

Regardless of the method to be used, the prospective flock owner should make an effort to start his flock with early hatched chicks, since those hatched late rarely, if ever, do so well as those hatched early in the spring. March and April are the best months for hatching chicks in most sections of the country.

The ultimate size of the flock, of course, will depend on the size of the laying house provided. In building a house allow at least 3 square feet of floor space for each grown bird. Crowding chickens in the house and keeping too many on a limited area are common causes of failure.

The annual quantity of purchased feed for a small flock generally ranges from 50 to 75 pounds per bird, depending on the quality and quantity of table scraps fed, the kind of range, and the breed of chickens.

After a flock has once been established, any additions or replacements of hens that are culled or that have died may be made by raising a new flock of pullets each year. Hatching eggs may be obtained from a flock of from 10 to 25 hens, but there is danger of inbreeding the birds too closely. New blood may be obtained by exchanging hatching eggs or stock with neighbors, but it is much bet-

ter to make purchases from a reliable poultryman who has a large flock of hens and selects only his best individuals for use as breeders. Breeding hens are commonly chosen for type, vigor, production of eggs, and eggs that are of good size. Such careful selection is difficult in a small flock.

INCUBATION OF EGGS

The following recommendations are offered to those who prefer to hatch rather than buy chicks. Select for hatching only fresh, even-sized eggs with strong shells, and keep them in a cool place not longer than 5 days. If a hen is to be used for hatching the eggs, give her no more eggs than she can fully cover. A hen of average size can cover 13 eggs. Set the hen in a nest away from other hens, with feed and water nearby. Supply her with whole grains and mash. Place the nest so that the hen will not have to fly up or jump into it. Dust the hen with commercial sodium fluoride (see page 13) before giving her the eggs so as to free her of lice. Be sure that the nest is free from mites. It is best to paint the cracks in the nest box lightly with anthracene oil or creosote oil as an insurance against mites.

Hens' eggs will hatch in 21 days after they are set.

Remove the chicks from the nest about 24 hours after the last chicks are hatched. In case an incubator is to be used, start it several days before the eggs are to be put in and see that it is properly regulated. Follow the directions of the manufacturer carefully, since different makes vary in their adjustment, care, and operation.

BROODING THE CHICKS

Day-old chicks from a hatchery or those hatched on the farm in an incubator must necessarily be brooded by artificial means. Chicks from a hatchery will usually arrive when they are 24 to 36 hours old and are ready to go into the brooder at once. If hatched in the home incubator, they should remain in the incubator until they are about that age.

Maintain a temperature of 93° to 95° F. in the brooder 6 to 8 inches inside the edge of the hover and 3 inches above the floor. Gradually reduce this until it reaches about 75° when the chicks are 5 to 6 weeks old. The temperature after the first day or two should be governed largely by the action of the chicks. Crowding of the chicks to the outside of the brooder, panting, or hard breathing indicates too much heat. Crowding and huddling about the heater indicate the need of more heat. The brooder is at the proper temperature at night when the chicks spread out around the heater or just inside the fringe of the hover. Keep the brooder stove going day and night. Use a wire screen to confine the chicks close to the brooder stove for the first 3 or 4 days until they learn to use the brooder.

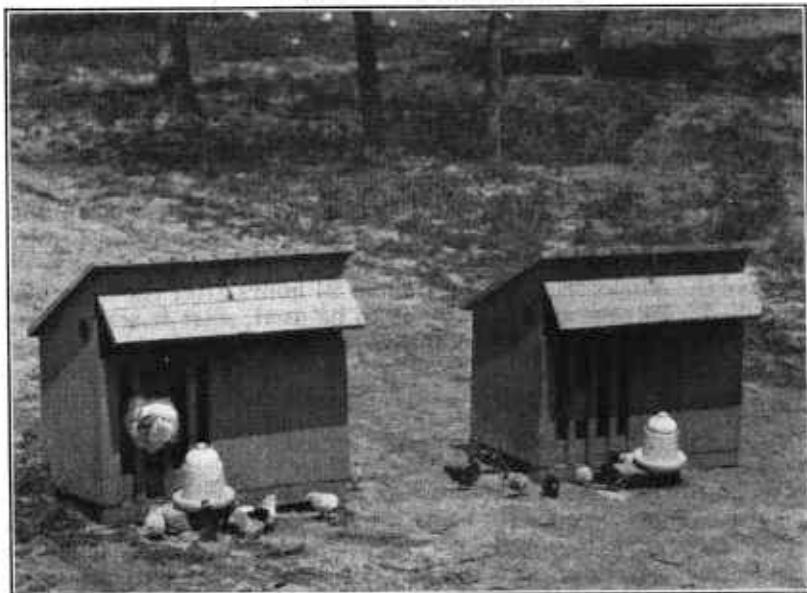
Although heat is essential, it is also necessary that they have plenty of fresh air. The simplest method of supplying fresh air is to let the heating system provide circulation. Get the chicks out of doors as soon as possible, where they will get plenty of sunlight and fresh air.

Clean the brooder or brooder coop every week, as cleanliness is essential to good health of the chicks. Cover the floor with sand

or litter to absorb the droppings. Keep the water dishes and feed trays clean.

Provide heat for the chicks until they are from 5 to 8 weeks old, depending on weather conditions and the development of the chicks. Provide low flat roosts to encourage the chicks to begin roosting at least by the time they are half grown.

A hen will brood from 10 to 15 chicks in cold weather and from 15 to 20 in warm weather. Provide each hen with a coop having an open front fitted with slats to allow the chicks to run outside (fig. 1).



3276-C

FIGURE 1.—Hens with their broods. The horizontal opening near the top of the coop provides ventilation.

The hen is kept confined to the coop or a small covered yard may be attached to the coop. The chicks may be allowed to range after they are a few days old. The coop should be moved each week to fresh ground. A floor in the coop will help to keep the brood dry. Incubator chicks should be free from lice unless they are brooded in an infested yard or brooder house.

FEEDING THE CHICKS

In selecting a diet for young chicks the flock owner should aim to maintain the maximum growth of his flock. A proper diet will keep the pullets growing so they will begin laying when they are from 5 to 7 months old, depending on the breed. The young chicks should be kept apart from older poultry as the chicks are more likely then to get enough feed and are less apt to become diseased or infested with parasites.

The chicks should be fed an all-mash ration, containing cod-liver oil, for the first 3 or 4 weeks. This is fed in trays or small hoppers about twice a day, and enough mash is given to last until the next

feeding. After 3 or 4 weeks finely cracked grain may be fed once or twice daily, and dry mash kept in the hoppers all the time.

After the chicks are 4 to 5 weeks old and are out of doors on grass they will do all right if fed any good growing mash and finely cracked grain. At first it is a good plan to feed only about 1 part of cracked grain for each 9 parts of mash. The proportion of cracked grain should be increased gradually until the chicks are about 10 weeks old. After the chicks are about 8 weeks old, a more coarsely cracked grain may be used.

Some poultrymen raise chicks by using the so-called "all-mash" method of feeding. This plan calls for the continuous feeding of starting mash until the chicks are old enough for growing mash which is fed until they are nearly grown.

As some of the chicks may not learn to eat so quickly as the others it is a good practice to train them all to eat during the first day feed is placed before them. This is done easily by taking the chicks from under the hover every hour or so and placing them on boards or pieces of cardboard on which a small quantity of feed has been scattered. On the second or third day suitable, small feed hoppers or feeders should be placed on the boards where the chicks have learned to get their feed. After the chicks have learned to eat it is a good practice to keep feed and water before them all the time. As the chicks increase in size, larger feed hoppers and water containers should be used.

For only a few chicks it is best to purchase prepared starting mashes and fine chick grains until the chicks are old enough to eat the large scratch feed. A growing mash may be used to replace the starting mash when the chicks are 4 to 5 weeks old.

Plenty of feeding and drinking space is essential. At first 2 inches of feeding space and one-half inch of drinking space per chick should be provided. As the chicks grow older both feeding and drinking space must be increased. Careful observation of the chickens at the feed hoppers and water containers is the best guide to follow in providing such space. If throughout the day the chickens are crowded around the feed hoppers or water containers, more feeding or drinking space should be provided.

During the hot summer months it is sometimes difficult to get growing chickens on range to eat enough feed for good growth. For this reason it is desirable to provide plenty of natural or artificial shade and to keep both feed and water in these places.

FEEDING THE LAYERS

A flock of laying hens should be fed mash, grain mixture, oyster shell, and grit. Fresh table scraps and milk, if available, may be included. The flock should also have plenty of clean fresh water to drink.

Mash is necessary to get good egg production. Feed about equal parts of mash and of grain mixture. Keep the mash before the hens all the time.

The grain mixture may be composed of 2 parts corn and 1 part each of wheat and oats, provided the oats are of good quality, if not, then use 2 parts of corn to 1 of wheat.

It is common practice among poultrymen to feed the grain or grain mixture once or twice daily. On the other hand some poultrymen prefer to keep both grain and mash before the chickens all the time. When grain is fed twice daily, about one-third of the total quantity to be fed that day is fed usually during the morning and the remainder just before the birds go to roost. If the chickens do not eat enough mash to maintain good egg production, it may be advisable to delay the morning feeding of grain until 10 or 11 o'clock. It will be worth the extra time to keep a record of the quantities of mash and grain that are consumed and to attempt to feed as much of one as of the other.

Feeding the mash dry in self-feeding hoppers saves labor and always gives the birds enough feed. With a small flock moist mash may be fed daily in V-shaped troughs. The table scraps may be fed on top of the dry mash or mixed in with the moist mash.

The owner of a small flock had better purchase one of the good commercial laying mashes on the market.

If the table scraps are used alone it is advisable to feed them in a large pen or on a platform of wood so that any product not consumed can be easily removed and the feeding surface kept clean. Sloppy garbage and material heavily salted are not suitable for feeding poultry.

Eggs are so rich in protein that the grains do not contain enough of it to maintain heavy production. The hens that are laying heavily, therefore, must have an additional supply of protein from other sources. Good laying mashes usually contain meat scrap or fishmeal and sometimes dried milk. The protein in these feeds is superior to that in any of the grains for the production of eggs.

Skim milk is also a valuable source of protein and vitamins, and it seems to keep the laying stock in good condition. Whenever milk is obtainable at a reasonable price—not usually exceeding 30 cents a hundred pounds—it may be used to replace the dried milk and the meat scrap in the mash.

Laying hens need more minerals in proportion to their total feed requirements than most other classes of animals. This is primarily because the eggshell is largely composed of calcium carbonate. This is best supplied in the form of crushed oyster or clam shells, or limestone. A constant supply of one of these products should be kept before the hens.

Chickens grind their feed in the gizzard, and in order to do it most efficiently they should have plenty of grit or small pieces of gravel. Provide this by buying one of the different kinds of grit on the market or by providing the birds with a supply of gravel of suitable size.

The flock owner is especially concerned about the feed because the cost of feed represents the principal cost of producing eggs. Most hens lay well during the spring months, but in the summer or early fall the hens start to molt and lay few if any eggs for about 3 months. Since early pullets are usually ready to lay by October, it is advisable to have at least one-half the flock made up of pullets to supply eggs while the prices are favorable. If the pullets are from bred-to-lay stock, are properly housed, and are well fed they should each lay about a dozen eggs during October and slightly more during the next 2 months. Yearling hens will average

only about 4 during October and 2 in November as most of the hens will be molting. The average yearly production of a flock of hens that are well cared for should range from 120 to about 160 eggs per hen.

Laying hens of the light breeds, such as the Leghorns, Anconas, and others, consume on an average about 70 to 85 pounds of grain each year, when they get no other feed. Heavier hens, such as the Plymouth Rocks and others of similar size, will consume, on an average, about 80 to 95 pounds of grain each year. A flock of 30 Leghorns will eat about 3 pounds of scratch grain and 3 pounds of mash daily, while the same number of Plymouth Rocks will consume about $3\frac{1}{2}$ pounds of each feed daily.

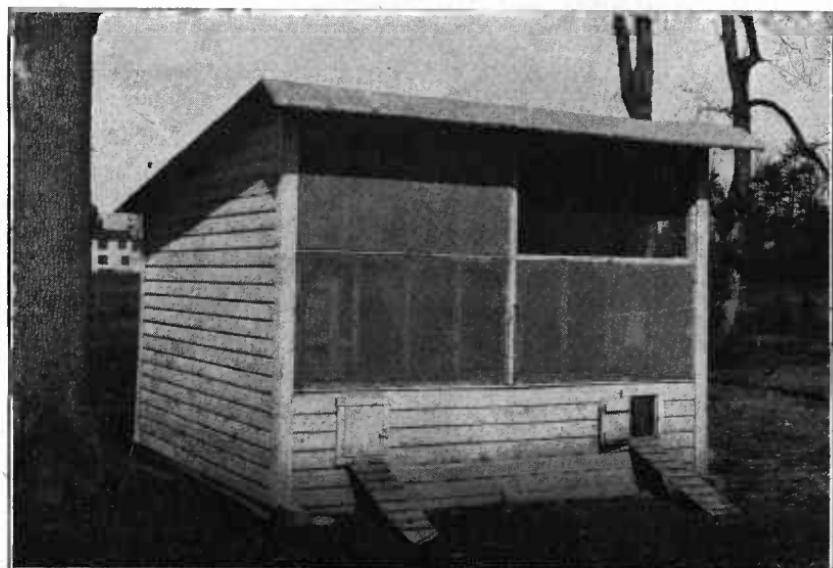


FIGURE 2.—A good type of house for a small flock of chickens.

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HOUSES AND EQUIPMENT

In considering the type and construction of the poultry house it is often advisable for the beginner of moderate means to build a small, inexpensive house that will serve for a year or two and later either add to this or build another house (fig. 2). After such a period the requirements of the enterprise and opportunities for its development will be more definitely known.

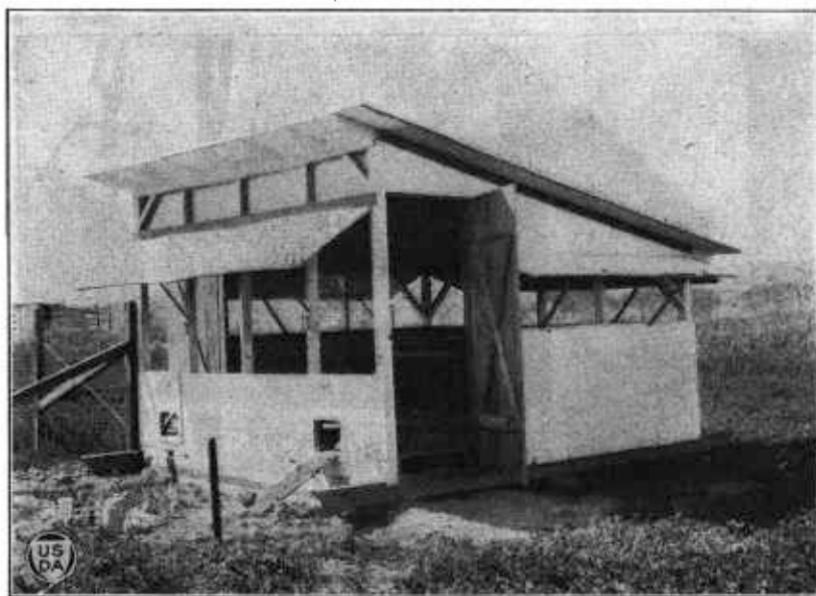
A dirt floor may be used on light, well-drained soil to save expense, but is not so satisfactory as a concrete or a wood floor. Concrete is the most desirable and most easily kept clean, but is not commonly used in a small house because of the greater difficulty of moving the building.

A small poultry house should be so constructed as to keep the birds dry, protect them from drafts in bad weather, provide ample ventilation in hot weather (fig. 3), and make it easy for the operator to attend to the needs of the flock. The house should be at least 6 feet high in front and $4\frac{1}{2}$ to 5 feet at the rear so as to allow comfortable working space for the operator.

The depth of the house is important because the deeper the house the less possibility of drafts reaching the birds when they are on the roosts at the rear. A depth of at least 10 feet is desirable, and houses 12 to 18 feet deep are much more comfortable.

A safe rule is to allow from 3 to 4 square feet of floor space for each bird to be housed. The lighter breeds, such as Leghorns and Anconas, will do well with less than the heavier birds, such as Rhode Island Reds and Plymouth Rocks.

Ordinarily, a shed-roof type of house is the most economical to build. Place the roosts about $2\frac{1}{2}$ feet above the floor and install a droppings board 4 to 6 inches under them (fig. 4).



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FIGURE 3.—A house suitable for use in the South as it provides plenty of ventilation during the summer. Comfort for the laying hens in hot weather is as necessary as in cold weather.

Make the roosts of substantial material with the upper edges slightly rounded. Leghorns require 8 inches of perch room per bird and Plymouth Rocks or similar breeds, 10 inches per bird.

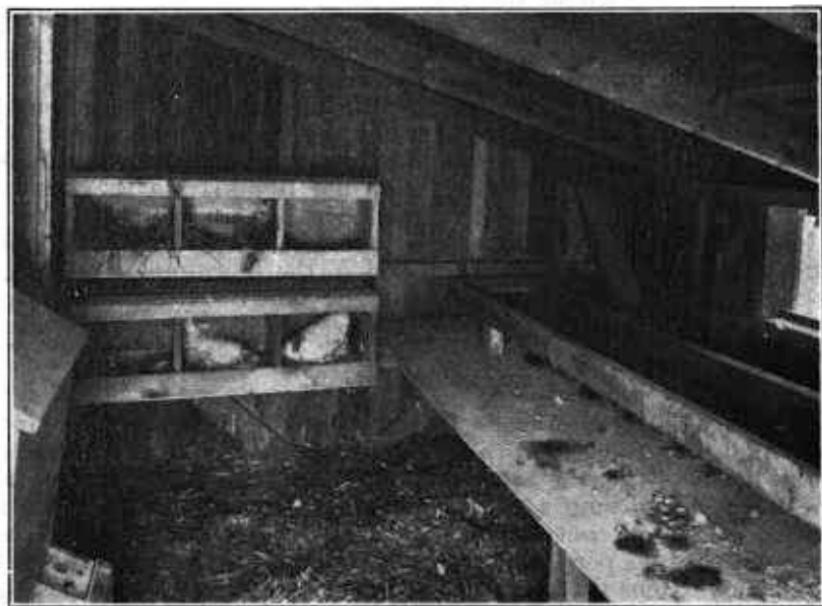
Locate the nests in convenient places in the house. Many small-flock owners use egg or orange crates filled with straw. Sectional nests along the wall built in such a way that the hens may enter from the rear and the eggs may be removed from a special door at the front are better and tend to prevent egg eating among the birds. Provide a nest for about every 4 or 5 hens in the flock.

Install a broody coop with a slat bottom for breaking up any hens that want to set, unless they are needed for hatching eggs. Contrary to a common belief, broody hens need to be well fed in order to hasten their return to egg production.

Place a dry-mash hopper at a convenient location in the poultry house. This will not only save time in feeding the flock, but will also help to insure maximum production. Hoppers may be pur-

chased ready-made or built at home. Two important features of self-feeding hoppers are that they make the mash readily accessible to the hens and they prevent excessive waste.

Drinking water should be accessible to the hens at all times; eggs contain about 65 percent of water. Set a large pan or pail in a square frame or box so that the vessel stands about 5 inches above the top of the frame. Make the frame so that the top of the water vessel will stand about 18 inches above the floor. This will keep the vessel free from straw and dirt. Cover the vessel partially so that birds can drink easily but not get into or contaminate the water.



3272-C

FIGURE 4.—Interior of a small chicken house showing roosts with droppings boards, nests built to the wall, and feed hopper (at extreme left).

Keep plenty of clean straw or other litter on the floor. This will help to keep the house clean and also cause the hens to exercise. The litter should be about 2 inches deep and should be renewed whenever it gets dirty, as a floor with damp litter may cause a decrease in egg production.

A flock of 15 to 25 hens will require only a small yard, and it is usually more practical to provide one than to keep the flock indoors. If space outside the poultry house is limited it will require only a little time and material to install a wire-covered sun porch. This porch may be only about the size of the house but it should have a floor of cinders, concrete, or better, 1-inch-mesh wire netting stretched on a stout frame a few inches above the ground. This kind of yard is also very desirable for young chickens as it will keep out dogs, cats, and hawks. For large yards that cannot be covered with wire netting without undue expense, fences at least 5 feet high

are needed. If the birds are of the light breeds, it may be necessary also to clip the large feathers on one wing of each hen to keep them confined.

In order to prevent the soil from becoming contaminated with disease organisms and parasites from the droppings, it is advisable to cultivate the yard at least once a year, and, if possible, seed it to a green crop. A better plan is to provide two yards so that the hens may use one while the other is seeded to a green crop. Some flock owners keep the chickens confined to the house and sun porch during the summer and use the yard for a garden. The yard is used by the chickens the rest of the year. Hens may be kept confined to the house throughout the year with good results provided cod-liver oil is included in their feed. Some poultry raisers keep the hens confined to the house during the winter months.

Many commercial poultrymen use artificial lights in the laying house during the fall and winter months as a means of lengthening the hens' working day, thereby stimulating egg production, and this may be practical for small flocks if only a small installation expense is involved. The usual practice is to use lights from the first of October until the latter part of March. The lights are usually turned on by an alarm clock about 4:30 a. m. and kept on until daylight, being turned off when the flock is fed in the morning. The lights are kept on long enough to give the hens about 12 to 14 hours of "working time" in order that they may eat more feed and lay more eggs.

CULLING THE FLOCK

One of the quickest methods of increasing the average egg production of a flock is to cull out the poorest layers. In the fall when the pullets begin to lay, the early maturing birds should be marked as good layers by placing a colored celluloid band on one leg. Mark also any hens that continue laying late in the summer and fall, as these are known as persistent layers. They will have bleached beaks and shanks. Hens that go broody should be marked for marketing later as their annual production will be considerably less than hens that do not go broody. During the summer and fall the poor layers will usually molt earliest. By careful observation of the flock, the poor layers can be culled out from time to time and only the best ones kept over for layers the following year.

It is well to bear in mind, however, that a hen's production gradually decreases as she gets older. It may pay to keep some hens the third year, especially if one is selecting hatching eggs from the flock, but generally pullets should replace all the hens that are more than 2 years old. The banding of the flock should therefore indicate the age of the birds as well as show which are the best producers.

Select only healthy, vigorous pullets that have grown well and have good body size. Select those with bright, full eyes, and with bright yellow pigmentation in the shanks and beak. Early maturing pullets make the best layers. Pullets of the Leghorn and other light breeds usually begin laying at 5 to 6 months of age and those of the heavier breeds at 6 to 7 months. When culling pullets handle them as carefully as possible.

PREVENTION OF DISEASE

Generally it is easier to prevent disease from getting a foothold than to cure an ailment that appears in the flock. Sanitary conditions in the poultry house and yard will help to keep diseases and parasites out of the flock. Keep any land used for poultry free from contamination by regular cultivation and the growing of grass, alfalfa, or other green crop. Some poultrymen lime their soil annually. It is of course necessary to keep poultry houses clean at all times and well littered with clean, dry straw or other suitable litter. Keep the houses free from dampness by providing good ventilation, but avoid drafts. Overcrowding should also be avoided as it tends to reduce the vitality of the birds.

Remove from the laying flock any birds at the first indication of sickness as a necessary precaution against loss.

Give the healthy members of the flock the first consideration as their welfare is of far greater importance than that of 1 or 2 sick birds. After the sick birds are culled out of the flock, clean out and disinfect the poultry house and cleanse thoroughly all feeding and drinking utensils.

If treatment of sick birds is advisable, keep them separated from the rest of the flock. Quarantine birds suffering from contagious disease until all danger of contaminating the rest of the flock is passed. In many cases, in an outbreak of disease, it is better to kill the affected birds at once and burn them or bury them deeply. Do not allow birds that have died of disease to be fed to other animals.

It is a good plan to give the poultry house a thorough cleaning and disinfection every few months and especially after sick birds have been kept for treatment. Keep the poultry house free from mites by painting the roosts, roost supports, and nests with crude petroleum or anthracene oil.

It is also well to treat the birds with lice powder. One of the best of these is commercial sodium fluoride. Rub a small pinch of it into the feathers of the head, neck, back; breast, each thigh, below each wing, at the tail head, and under the vent. This is a very effective way of keeping fowls free of lice.

PRODUCING HIGH-QUALITY EGGS

The most desirable eggs are those of a high quality. The flock owner should produce only clean, full-sized eggs that have sound shells and are all of the same color. This is especially desirable if he intends to sell eggs.

Careful management will do much to eliminate poor-quality eggs. Dirty poultry houses and dirty nests are the common causes of dirty eggs. Candling is the only means of detecting blood spots in market eggs. Blood rings are caused mostly by allowing the males to run with the flock during warm weather and by broody hens sitting on the nests that are used by laying hens. Musty and off-flavor eggs often result from storage in a poorly ventilated cellar or storage room.

Most of the conditions that cause bad eggs can be eliminated or improved. Such improvements usually pay for the extra cost by

increasing the number of high-quality eggs from the flock. The following directions should help flock owners obtain better eggs.

Keep the hens in a comfortable, sanitary laying house and provide clean nests.

Gather the eggs regularly, preferably two or three times daily during warm or very cold weather and once daily at other times.

Keep the eggs in a cool place that is free from odors.

Keep all male birds out of the laying flock, except during the breeding season when hatching eggs are to be saved from the flock. Either kill or sell any males that are not to be held over for the next breeding season.

FINISHING CHICKENS FOR THE TABLE

If there is a special market for dressed fowls it may pay the grower to feed a fattening ration to the birds that are selected for the purpose. Ordinarily there is not much to be gained by a small-flock owner in attempting to finish or fatten his chickens before he markets them, especially if they are in good condition as a result of having been raised on well-balanced diets. However, considerable weight may be gained by healthy chickens that are not in good flesh by feeding them liberally on a suitable feed mixture.

In finishing young cockerels for broilers it is necessary to feed more protein than in feeding older birds because the cockerels are still growing. They will make the best gains if placed in small pens and fed a mash moistened to a crumbly consistency with milk or buttermilk, two or three times a day. The first few feedings should be relatively light but beginning with the last feeding on the second day the chickens may be given all the wet mash they will eat in half an hour.

The appearance and condition of dressed poultry depend greatly on the care used in the killing, packing, and cooling. Chickens should be dressed preferably when the weather is cool, when the birds are to be used soon or when it will take only a few hours to reach the market. No solid food should be given the chickens for 24 hours before killing, but plenty of water should be supplied.

Market fowls may be either scalded and picked or dry-picked after being killed. Scalding is the easier method. Dry picking is more difficult, but it results in a much more attractive fowl, which may sell more readily on some markets. The dry-picking method also requires a special method of killing the bird by cutting the jugular vein in the back of the mouth and sticking the knife blade into the brain through the roof of the mouth.

PRESERVING EGGS

Ordinarily there will be a surplus of eggs in the spring and a shortage in the fall and early winter. For home use some housewives follow the practice of preserving the surplus eggs in water glass or limewater. Water glass may be obtained from drug stores in the form of a thick sirup. This liquid is mixed with nine parts of boiled water and poured in an earthenware crock or galvanized can. The jars or cans should be thoroughly cleaned before they are used. Fresh, clean, infertile eggs, free from cracks, are then placed in the liquid, with 2 inches of liquid over the eggs, and the jars should be kept tightly covered while in use. March and April are the best

months in which to store the eggs, which are usually taken out of the solution from September to February. The eggs should be removed from the jars only as needed for immediate use and should be washed to remove the preservative material from the shell. Similar methods are used to preserve eggs in a clear limewater solution obtained by slaking 3 pounds of lime in 5 gallons of water. Galvanized containers are not suitable for the limewater solution.

DUCKS AND GEESE

Although the keeping of ducks or geese is seldom a suitable enterprise for the average small-tract holder, there may be conditions under which some kind of waterfowl will be profitable. If the farm contains or adjoins a stream or small lake, the keeping of such fowls merits consideration. One advantage in raising either ducks or geese is that they may be kept with less care and attention than a flock of chickens of the same number of birds. Geese, in particular, will get their entire living after the first few weeks from a good pasture so long as the grass remains green.

Anyone planning on keeping waterfowl should obtain additional information on care and management from his county agricultural extension agent or from the U. S. Department of Agriculture.

TURKEYS

Turkeys are not so suitable for small-scale production as other classes of poultry because turkeys thrive best on more range and an abundance of green feed. The initial cost for breeding stock or setting eggs is usually more than for other poultry, and the young stock requires special attention during the brooding season. However, when there is opportunity to use a large open tract or field having some kind of green feed, turkeys may be raised profitably. Knowledge of methods of management and disease control is almost indispensable to success. Turkeys should never be allowed to run with chickens or on land used for them, since chickens harbor the blackhead organism which causes serious losses in turkeys.

SQUABS

The family on a small plot of land where conditions are not favorable for raising chickens may find it practicable to raise squabs for the home table. The advantages in raising squabs, which are young pigeons that are about ready to leave the nest, are that they require very little land, the pigeons raise the young birds, and the squabs usually bring good prices. However, the demand for squabs is not nearly so general as the demand for chickens and eggs.

The average annual return above feed cost can be estimated by using local prices, allowing an annual production of from 10 to 14 squabs for each pair of breeders, and a feed consumption of from 90 to 100 pounds per pair. Additional income may often be obtained from the sale of breeding stock, especially from high-producing flocks.

The breeds of pigeons that are used for squab production are selected primarily as prolific producers of good-sized squabs with minor consideration given to selection for type and color. The greatest demand is for the breeds that produce good-sized squabs with light-colored skin. The King, Carneau, Mondaine, and giant Homer are good producers of squabs of this type, and carefully selected stock of these breeds should produce squabs weighing from 14 to 24 ounces each, live weight, at 26 days of age.

HOUSES AND EQUIPMENT

The breeding stock is housed in a special shed or loft where they are allowed to nest and rear their young. Adjacent to the loft is an enclosed pen, or fly, where the birds may fly about and get their



FIGURE 5.—A two-pen back-yard pigeon house. This building is 12 by 16 and will accommodate about 50 pairs.

feed and water (fig. 5). The loft may be built for the purpose, but satisfactory results may be obtained from an unused part of a stable or other building.

The type of house to be used will depend largely on the climate. In the South an open-front house with plenty of ventilation is desirable, while for the colder sections a closed-front type is better. The house should face south and be located on soil which drains well. A pigeon house should be made so that it will provide fresh air, sunlight, and space enough to keep the pigeons comfortable. The more sunlight in the house the better, as it helps to keep the building dry and sanitary. The house must be free from drafts, and all walls except the front should be tight.

The interior fittings consist of a double nest for each pair of breeders, nest bowls, and feed hopper. Double nests are necessary as the female pigeon will usually lay again before the squabs are old enough to leave the nests. The nests are usually built at least 12 inches square, 15 inches high, and 4 or 5 tiers high (fig. 6). All interior equipment should be as simple as possible to keep costs low and to facilitate cleaning.

Build the hoppers and feed troughs large enough so that the pigeons cannot waste the grain. Provide bathing facilities in the yards so that the pigeons can bathe daily. Water for bathing helps to keep the pigeons in good health and free from insect pests. A galvanized-iron pan about 5 inches deep and from 15 to 20 inches in diameter makes a good bath pan. The pigeons will drink the bath water; therefore these pans should be left in the pens for only 2 or 3 hours each day. Water fountains for drinking may be kept either in the yard or in the house. It is very important to keep all water utensils clean and to keep the pigeon house absolutely dry.



FIGURE 6.—Open-front double nests with 6-inch board in front. Nests made of egg crates are shown at the right.

Sanitation is essential to successful squab production. Keep the pens and yards clean and the birds free from disease and insect pests. If one begins with healthy stock and gives it proper management there should be no serious disease. On the other hand, crowded houses, poor feeding, damp or poorly ventilated pens, lack of cleanliness in the pens and yards, and careless selection and breeding of the stock may lead to heavy losses in the flock. It is much easier to prevent than to cure disease.

CARE OF THE BREEDERS

Keep only mated pairs in the pen, as any unmated males are apt to disturb the pairs by fighting. The hen usually lays only two eggs, which hatch after 17 days incubation. Both parents build the nest and take turns sitting on the eggs and feeding the young until they are marketed or until they are able to take care of themselves. The hen often lays another setting of eggs when the squabs are from 2 to 3 weeks of age and leaves the feeding of the squabs from then on largely to the male.

Squabs are reared and fed by both of the parent birds on a thick, creamy mixture called pigeon milk, produced in the crops of the pigeons. Pigeons usually feed their squabs shortly after they themselves are fed and should not be disturbed at that time.

FEEDING PIGEONS

The method of feeding pigeons differs radically from the feeding of other poultry. Pigeons do not need much mash or green feed. A high protein grain, such as cowpeas, field peas, or peanuts, must be used in order to get the desired protein content in the ration. As the grains of high protein content are the most expensive ingredients in the ration, it is advisable to use only as much as is needed for good growth.

The selection of the grains to use in a pigeon ration is influenced by the price and availability of the grains and by the results that have been obtained in feeding pigeons. Corn, kafir, peas, and wheat are the grains most commonly used. A good pigeon feed may be made up as follows:

PIGEON FEED

Ingredient	Parts by weight	Ingredient	Parts by weight
Whole yellow corn-----	35	Oat groats-----	5
Kafir or milo-----	20	Hempseed-----	5
Cowpeas or field peas-----	20		
Hard red wheat-----	15	Total-----	100

The corn in this feed may be reduced to 25 parts during the summer months. A simpler ration could be made up by omitting the oat groats and the hempseed.

A suitable mineral mixture is an essential part of the pigeon's diet, as all the grains and seeds commonly fed are low in minerals. Keep a mixture of various minerals, containing grit, oyster shell, limestone, and salt, before the pigeons all the time. Limestone or granite grits are used. Crushed oyster shell (medium size) provides lime (calcium) used in the formation of the eggshells and bone. Salt is essential in the diet and should make up from 3 to 5 percent of the mineral mixture. A product such as Venetian red, containing iron, is usually included. A mineral mixture containing these products may be made as follows:

MINERAL MIXTURE FOR PIGEONS

Ingredient	Parts by weight
Medium-sized crushed oyster shell-----	40
Limestone or granite grit-----	35
Medium-sized hardwood charcoal-----	10
Ground bone-----	5
Ground limestone-----	5
Salt-----	4
Venetian red-----	1
Total-----	100

The mineral mixture, usually slightly moist, is kept before the pigeons in a hopper or open pen.

Many squab producers use commercial-mixed pigeon feeds, especially if they are feeding only small flocks. The quality of these feeds is usually good; and, because of the number of grains needed, it is easier to buy them for a small flock than to mix the ration at home.



FIGURE 7.—Squab 4 weeks old; fully feathered under the wing and ready for market.

garden products and table scraps, he can greatly reduce the cost of his meat. If pigs are to be raised and fattened entirely on feeds that must be purchased at retail prices, it is not likely that the undertaking will be profitable. An average pig will eat close to 1,000 pounds of grain if finished at 200 pounds. However, pigs having plenty of other feed do fairly well without much grain, and if given proper quarters and care they will make satisfactory gains on feeds that would otherwise be wasted. In some communities it may be more practical to purchase a fat hog for butchering than to buy feeds for fattening a pig.

Almost any type of shelter will be suitable for 1 or 2 pigs that are to be fattened for slaughter. The most important considerations are to provide (1) protection from the rain or snow, (2) shade in hot weather, and (3) a floor that will enable the animals to keep dry. The pen should be located far enough from any dwelling house to prevent annoyance from bad odors. Some communities have restrictions against keeping pigs within their borders. The question of local ordinances should be investigated.

The best time to buy a pig is in the spring when it is being weaned from its mother. A pig of this age, from 6 to 10 weeks (fig. 8), commonly costs about \$5, although the price will vary greatly, depending on the quality of the pig, the location, market conditions, and the cost of feed. To obtain best results it is advisable to purchase animals that have been raised on clean ground, under a plan known as the "swine sanitation system", as a precaution

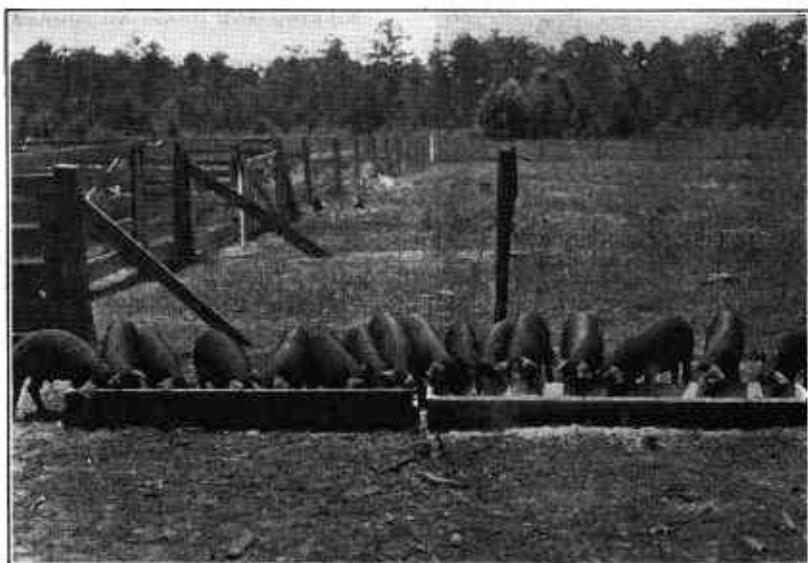
KILLING AND DRESSING SQUABS

Squabs grow very rapidly and are ready for the table at about 26 days of age or when fully feathered under their wings (fig. 7). They should be killed and dressed just as soon as they are about ready to leave the nest because if not killed at this time they soon lose their baby fat, and their flesh begins to get hard.

PIGS

The commercial production of pork is best suited to the conditions of the corn grower or general farmer who can raise most of the necessary feeds, but if the small-farm operator can raise and fatten 1 or 2 pigs chiefly with surplus

against internal parasites. A runty pig will seldom, if ever, make economical gains. A sow pig will usually be satisfactory, but a boar pig will not make as desirable growth as one that was castrated before being weaned. If there is any hog cholera in the neighborhood, or if garbage of any kind is to be fed, it will be necessary to get pigs that have been immunized against this disease.



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FIGURE 8.—Pigs about the right age to be weaned from their mothers.

FEEDING PIGS

The method of feeding will depend on the kind of feed available and the type of pen or pasture. The most convenient method is to provide grain, a protein supplement, and some minerals in separate compartments of a self-feeder; keep an ample supply of fresh water for drinking, and allow enough pasture to last the animal 2 or 3 weeks before the pen is changed to new ground. If pigs are allowed access to good pasture they will thrive on from 10 to 15 percent less feed than if no pasture is available. In case table scraps or selected garbage can be obtained from several homes or from a restaurant, such feed will materially reduce the quantity of feed to be purchased. Garbage for hog feed should be kept free from paper napkins, soap, washing powder, glass, other such materials, and dish water, and it should be collected at least twice a week to prevent spoilage.

A number of grains are suitable for feeding pigs and selection will depend on the kinds available and the relative prices.

Corn may be fed on the cob or shelled. It does not pay to grind it for hogs. Yellow corn is superior to white corn when fed to pigs up to about 100 pounds' weight, when they are fed in dry lot. The difference in the feeding value of yellow and white corn does not appear when good legume pasture is available or when about 5 percent of good, leafy alfalfa hay or alfalfa meal is added to the

white-corn ration. For hogs weighing over 100 pounds, white corn seems to be equal to yellow corn, even in dry lot, especially if they have previously had good pasture.

Wheat will generally give somewhat better feeding results than corn. Experiments show that its feeding value varies considerably, but wheat will probably give about 5 percent better results than corn, pound for pound. The relative value of barley and corn depends to some extent on the weight, per bushel, of the barley. Good sound barley weighing 46 or more pounds per bushel is considered to be from 90 to 95 percent as good as corn. Barley of lighter weight has a lower feeding value.

Root crops are generally relished by hogs and are desirable but cannot be considered an economical feed. Good alfalfa pasture or alfalfa hay is usually more efficient.

Proso or hog millet is raised to some extent in the Western and Northern Plains States and is a good feed for hogs. It is carbonaceous and should be ground and fed with a protein supplement.

Although pigs require mineral feeds in addition to any of the feeds mentioned, the feeding of table scraps, vegetables, and other green feed will supply part of these needs. If the pig is to be raised on grains and only a small supply of table scraps, it will be advisable to supply a mineral mixture of equal parts of steamed bonemeal, ground limestone or air-slaked lime, and common salt. In sections where there is danger of goiter it is advisable to add 0.02 percent of potassium or sodium iodide to the mineral mixture.

Very often wood ashes are available and may be incorporated in the mineral mixture to advantage. When added to the above-mentioned mixture they may be used to the extent of one-third of the mixture by weight. Thus, 35 pounds would be the correct quantity to add to a 100-pound mixture of the ingredients listed.

A mineral mixture should be supplied to hogs in boxes or self-feeders where it will be dry and available at all times.

Charcoal is often used in mixtures and is superior to soft coal. Neither charcoal nor coal has much food value, but both appear to be highly palatable to pigs.

RABBITS

Raising the domestic breeds of rabbits, commonly kept for meat, affords almost any small-farm owner or suburban family an opportunity to produce at least a part of the meat supply at reasonable cost. Even the home having a limited yard space can be equipped easily for raising a few rabbits. Rabbits are now raised both as a side line on general farms and in back yards, to supply families with meat and at the same time provide an agreeable occupation for boys and girls.

The meat of rabbits is similar in flavor to that of chickens and has about the same protein content as other lean meats. In terms of live weight, rabbits afford about the same proportion of edible meat as do young broiling chickens, but the dressed carcass of the rabbit contains a larger proportion of meat. Rabbits are usually raised for

home use, but in most localities the meat can be marketed to advantage, and the skins may be sold to dealers.

The beginner who desires to stock a few hutches at a minimum cost may purchase either young rabbits just weaned or a few mature animals that are about ready for breeding. Young stock will, of course, be cheaper than mature animals, but the does will not be old enough to breed until they are about 6 to 8 months old. In any case it is desirable to obtain stock from a reliable breeder who will guarantee his animals to be as represented.

The breed to be selected will depend on the personal preference of the purchaser and the kind of fur desired. The rabbits best suited for home and commercial production of meat and fur are the medium and larger breeds, such as New Zealand, American, Bevern, French Silver, Chinchilla, and Flemish Giant. White rabbits are usually the most desirable, provided they are good meat producers, because the fur is more salable and can be dyed any color desired.

The gestation period of rabbits is 31 days, and a good doe will usually raise from 6 to 8 young in a litter. She should be bred again when the young are weaned at 7 to 8 weeks of age, so as to produce four litters each year. Well-grown young rabbits will be large enough to eat when about 2 months old. A rabbit of one of the medium breeds should weigh approximately $3\frac{1}{2}$ pounds live weight at this age. Thus a good medium-type doe should produce about 75 pounds of live 2-month-old rabbits each year, allowing for slight mortality in the litter.

FEEING RABBITS

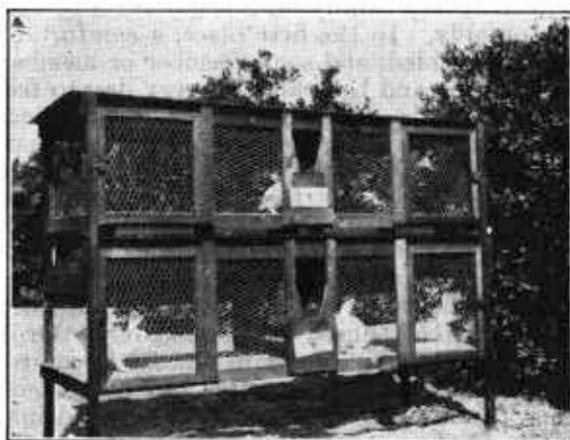
Although many kinds of feed are suitable for rabbits, those most commonly used are barley, oats, or wheat (rolled or ground), and alfalfa or clover hay. A protein supplement, such as peanut, soy-bean, or linseed meal, should constitute from 14 to 30 percent of the doe's ration during the time she is suckling her young. Best results are usually obtained by feeding young stock, does without litters, and bucks a ration consisting of 40 percent grain and 60 percent good legume hay. The hay should be either chopped or cut into short lengths. It is advisable also to feed a small quantity of freshly cut alfalfa or clover, garden vegetables, or other green feed to supply vitamins, and to mix 1 percent of good-quality bone meal in the grain to prevent mineral deficiency. Salt should be fed either by adding 1 percent in the grain or fastening a small piece of compressed salt inside the hutch where the animal can lick it. Experiments conducted by the United States Bureau of Biological Survey show that approximately 180 pounds of hay and 120 pounds of grain are required to maintain an average-sized doe and her four litters to the usual weaning time of the young rabbits, which is when they are 8 weeks of age. A mature buck will require only about half as much total feed, or 115 pounds of hay and 30 pounds of grain.

Alfalfa, clover, or grass cut from beneath fruit trees that have been sprayed to control insect pests, or garden crops that have been sprayed should not be fed to rabbits.

HUTCHES

Mature does should be kept in individual hutches under a shed or be provided with a roof large enough to keep out the rain (fig. 9). Large numbers of young rabbits can be placed in developing pens properly sheltered against rain. Many rabbit growers install self-cleaning hutches having wire floors of $\frac{5}{8}$ -inch mesh hardware cloth.

Even though only a few rabbits are to be kept, such a wire-cloth bottom can be provided in a simple home-made hutch that affords plenty of ventilation and a moderate amount of sunlight. They should be placed on legs about 3 feet above the ground. If wire netting is used for



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FIGURE 9.—Rabbit hutches of a type suitable for back yard.

the front, it should not be larger than 1-inch wire mesh. Hutches should be about 16 inches high, at least 18 inches deep, and 2 feet long.

THE DAIRY COW

Every farm family with growing children should by all means consider the possibility of keeping a milk cow, in order to reduce the cash outlay for food and to provide a satisfactory diet. A good milk cow will furnish a large proportion of the family's food requirements, add variety to the diet, and provide food that is essential for good nutrition and health.

Nutrition specialists recommend from three-fourths to 1 quart of milk a day (or its equivalent in other dairy products) for a growing child, and a pint a day for an adult. According to this recommendation, a family of 2 adults and 3 children would consume from about 1,200 to 1,500 quarts of milk a year. It is desirable for a family of this size to have, in addition, 90 to 150 pounds of butter. Milk and butter together are one of the large items of expense in a well-planned family food budget. To purchase the necessary quantities of milk in the commonly preferred forms often entails more expense than low-income families think they can afford. Consequently, many families do not purchase as much milk, butter, and cheese as desirable from a nutrition standpoint.

With a family cow providing a plentiful supply of milk, it is possible to convert some of the milk into butter, cheese, and ice cream. A generous supply of milk, cream, and butter materially reduces the cost of other foods and at the same time increases the nutritive value of the family's diet. Having an abundance of milk allows the family to use it also in the preparation of other foods.

A good dairy cow may be expected to provide all the fluid milk and cream required by a family of five during 10 or 11 months of the year, as well as two-thirds of the butter. In addition there should be considerable skim milk for making cottage cheese and for feeding poultry. For 1 or 2 months of the year, while the cow is dry, the family would have to purchase milk and milk products.

Conditions may not permit every family on a small farm to keep a cow satisfactorily or profitably. In the first place, a comfortable and sanitary stable must be provided, and some member or members of the family must have the time and be available every day to feed and care for the animal and do the milking. In the second place, considerable feed will be required. A cow giving a medium quantity of milk will require from 3 to $3\frac{1}{2}$ tons of good hay and about 1 ton of concentrates a year. If all this feed must be purchased, the cost in most parts of the United States usually will be not less than \$80, and it may be much more. In addition, about 800 pounds of straw would have to be purchased for bedding.

If a part of or all the necessary feed can be grown on the farm, the cost of keeping a cow will be reduced proportionately. Ordinarily 2 acres of good land will provide most of the feed required for 6 months of the year, which should reduce the feed cost almost half. Generally speaking, therefore, 2 acres for growing feed may be considered a prerequisite for keeping a milk cow on a farm, and if this acreage is not available, careful consideration should be given to the probable costs and returns before a cow is purchased.

Although a fairly good cow, well fed and cared for, will as a rule produce enough milk to more than pay for the feed, even when all the feed is purchased, the family must be able to utilize all the milk, or the venture may not be profitable. Therefore, the larger the family and the greater its use of dairy products, the more valuable the keeping of a cow is likely to be.

KIND OF COW TO BUY

Since the cow is to be kept mainly if not entirely for the milk she produces, it is better to select one bred for milk production rather than one bred for beef production. Suitable cows may be found in any of the five principal dairy breeds: Ayrshire, Brown Swiss, Guernsey, Holstein-Friesian, and Jersey. Either registered or grade cows may be used. Grade cows will be cheaper and will serve the purpose of the small-farm owner generally as well as registered cows. Cows of the Jersey and Guernsey breeds are more generally used for family cows. Cows of these breeds are smaller and for this reason do not require so much feed for maintenance as some of the larger breeds.

It is usually better to buy a young cow than an old one. A young cow is more likely to have a sound udder, and she has more useful years ahead of her. She should be old enough, however, to have demonstrated her ability as a milk producer. A cow that has had her second or third calf is preferable to either a younger or older cow.

WHERE TO BUY A COW

The closer home a suitable cow can be bought the better. The buyer has a better chance to observe the quality of the cows offered and to become acquainted with the reliability of the seller. Besides,

it is costly to transport cows for considerable distances, especially if only one is to be purchased. Ordinarily it is better to purchase near enough home so the cow can be led or driven home or transported by truck.

Some communities may wish to purchase a carload (20 to 30 head), in which case the buyers would be justified in acquiring them at a more distant point, since transportation charges per animal would not be very great. Suitable cows may be selected with less trouble and expense if the buyer visits some section where there is a large number of animals of the breed desired, where the breeders have kept production records, and where contagious diseases have been eliminated.

An inexperienced person should not attempt to buy a cow unaided. It is particularly inadvisable to attempt to buy a carload of cows some distance away without competent and reliable assistance. The county agent or some competent farmer in the community should be called upon for advice and help.

HEALTH AND HABITS OF THE COW

The cow selected should have a sound udder, teats of good size, and she should be an easy milker. The buyer should see her milked, or preferably he should milk her himself. The udder should be free of lumps or hardened tissue. As a rule, the more the udder shrinks in size as the milk is drawn, the better the udder. Avoid cows with large meaty udders that do not shrink with milking. The milk should be free of clots, flakes, or strings. To examine the milk for these abnormalities several streams of the first milk should be drawn from each teat on a small piece of clean window glass.

See that the cow has no evidence of bad habits, such as kicking, self-sucking, or breaking through fences. Such habits are not easy to detect by casual observation, but one should at least avoid buying cows that wear yokes, muzzles, or nose pieces.

The infectious diseases that are most serious in dairy cattle are tuberculosis and brucellosis, also known as Bang's disease or abortion disease. Tuberculosis-eradication work has resulted in the practical eradication of tuberculosis among cattle in the United States. Brucellosis, which causes abortions, is now one of the most, if not the most, troublesome disease among dairy cattle in many States. If possible, select a cow from a brucellosis-free herd, or at least from a herd which shows no evidence of the disease. Unless the cow is known to be free from it, buy her subject to test. Many States have laws requiring that all cattle brought into the State must pass a test indicating freedom from brucellosis, and it is unlawful to ship from any State, for dairy or breeding purposes, cattle that have not been tested and found free from brucellosis and tuberculosis.

The family cow should produce at least a medium quantity of milk. Unless the family is prepared to give the cow the best of care and feed and can use or otherwise dispose of a large quantity of milk to advantage, there is perhaps no particular object in buying a very heavy producer. Besides, the more milk the cow gives the

greater the purchase price is likely to be. On the other hand, it is not advisable to buy a low producer. Consult the previous records of the cow if they are available. A cow with a butterfat production record of 250 to 300 pounds a year made with ordinary feed and twice-a-day milking should be satisfactory; or, in the case of a cow with her first calf, 200 to 250 pounds. If previous records are not available for examination, a cow that is giving 25 or 30 pounds of rich milk a day 2 or 3 months after calving or 15 pounds 8 or 9 months after calving should be satisfactory.

THE COW BARN

The stable for the family cow should be comfortable. The cow may run loose in a box stall about 10 feet square, or she may be confined in a smaller space and held with a stanchion, chain, rope, or strap. The box stall allows the cow more freedom but requires approximately three times as much bedding as the other type of stall. It is easier to keep a cow clean in the smaller type of stall than in the box stall unless the box stall is kept well bedded. If a cow is confined with a stanchion, the space where she stands should be $3\frac{1}{2}$ or 4 feet wide and about $4\frac{1}{2}$ feet long. There should be a manger in front, extending about $2\frac{1}{2}$ feet beyond the platform on which the cow stands. Behind the cow there should be a gutter 6 or 8 inches deep and 16 inches wide. Behind the gutter there should be 4 or 5 feet of space to facilitate removal of manure and to permit the cow to get in and out of the stall. There may be a space in the front of the manger so that the feed can be given to the cow from the front, or it can be carried in from the rear of the stall. There are other less common types of stalls which would prove satisfactory.

The stable need not be expensive, but the sides should be tight enough to prevent drafts in cold weather. This is important if the cow is confined by a stanchion or in similar manner. It is not so important if the cow is kept in a box stall. In fact, except in the colder climates, the box stall may be entirely open on the south side if the other three sides are tight. An arrangement which permits the sun to shine into the box stall adds much to the comfort of the cow in cold weather. A stall that is entirely enclosed can best be ventilated by a tilting window, preferably on the side opposite to the prevailing winter winds. The stable, of course, should have windows enough to provide the necessary light.

SUMMER FEED

The aim on the small farm should be to raise all or nearly all the feed required for the 6 warmer months of the year. It is perhaps better to plan to buy the winter feed instead of raising it because of the extra acreage, machinery, and horsepower or other power that would be required.

If a cow is to be kept, at least 2 acres of good land should be devoted to raising feed. Much, if not all, of this should be in permanent pasture. Pasture is the easiest of all crops to raise, and after it is once established does not require much expense for maintenance. Besides, pasturage is desirable for the proper nutrition and continued well-being of the dairy cow.

Few, if any, grasses or mixtures of grasses can be depended on to provide a uniform supply of feed throughout the summer. The common grasses and clovers such as bluegrass, orchard grass, redtop, and white clover, used for pasture in the central and northern parts of the United States as well as in the irrigated regions of the West, make a rapid growth in the spring but a much slower growth in the dry, hot part of the season. At such time the pasture must be supplemented with some other feed. This may be done with pasture plants which make most of their growth in midsummer, or it may be done with green harvested crops, or with grain and cured hay.

Kentucky bluegrass and white Dutch clover grown together constitute the standard pasture mixture on all soils that are reasonably fertile and not too sandy, in the central, northern, and eastern parts of the United States. Lespedeza makes most of its growth in midsummer and thrives as far north as the southern boundary of Pennsylvania and southern Iowa. A good plan to follow in regions where both bluegrass and lespedeza do well is to seed 1 acre of the pasture to Kentucky bluegrass and white Dutch clover, and 1 acre to lespedeza. This is the easiest and cheapest way to provide plenty of summer feed.

Farther north, where lespedeza does not thrive it is better to plant a mixture of Sudan grass and soybeans on, say, a half acre next to the bluegrass pasture. This may be pastured, or such quantities as are needed may be cut daily with a scythe and thrown over the fence into the bluegrass pasture for the cow. Any of the Sudan grass and soybean mixture not needed to supplement the bluegrass may be put in a shock or small stack and fed to the cow after frost in the fall.

In the South, Bermuda grass, carpet grass, Dallis grass, and lespedeza make a good growth in the summer but do not come on early in the spring. The problem in the South is to supplement these crops in the winter and spring. It is suggested that 1 acre be devoted either to the grasses mentioned or to lespedeza or to both and that 1 acre be seeded in the fall to oats, rye, barley, or wheat to provide winter and spring grazing.

The garden can be expected to furnish a small part of the summer cow feed. Pea vines, sweet-corn stalks, cabbage leaves, and sweet-potato vines may be fed to the cow.

WINTER FEED

As a rule the winter feed for the family cow will consist of hay or other forage and a mixture of concentrates. Because of the equipment needed for making hay, it is not ordinarily advisable for the small-farm owner to make hay except possibly from some small quantity of green crops that may not have been needed for summer feeding.

Alfalfa, soybean, alsike clover, or early cut grass hay will prove satisfactory for winter feed. These hays should be leafy and have a good color. Buy from some farmer nearby, if possible, to save transportation charges. The quantity of the hay and concentrates to feed will depend on their relative costs and also on the quantity and richness of the milk produced. Feed a Jersey or Guernsey cow of ordinary size not less than 14 pounds of hay a day. This amount of hay along

with a pound of grain for each 2 pounds of milk produced will furnish all the nutrients required. Sixty pounds of concentrates will furnish as much nutrients as 100 pounds of hay. If 60 pounds of concentrates cost more than 100 pounds of hay, feed as much hay as the cow will clean up without waste, and reduce the concentrate allowance accordingly. If hay is relatively cheap and of very good quality and the cow is not producing a very large quantity of milk, it may not be necessary to feed any concentrates at all.

A mixture of ground corn and wheat bran will prove satisfactory for use with any kind of hay. When the mixture is used with grass hay, fodder, or mixed hay, add some cottonseed meal to provide the necessary protein. A ready-mixed milk-producing feed of a reliable brand may be used in place of the ground-corn and wheat-bran mixture.

Sometimes it is possible to buy good corn stover locally at a very reasonable price. If the cow is fed all the good corn stover she will eat and a mixture of wheat bran and cottonseed meal in addition, she will get along very well unless she is producing more than 12 pounds of milk a day. More feed, and a greater variety of feed, will be required when the cow produces more than this quantity.

The cow should be watered at least twice a day in winter and more often in the summer. See that ducks, geese, or dogs do not soil the water supply, and exclude chickens from the manger and feed of the cow.

CARE OF THE COW

The cow should always be handled gently and quietly. Dogs should not be allowed to worry or chase her. See that all fences are well constructed so that the cow will not develop a habit of breaking through. If the cow is always where she belongs, there will be no occasion for chasing or running her. A fence made of four barbed wires, tightly stretched and fastened to good posts, will keep any ordinary cow in the cow lot.

The cow should be brushed daily, especially in the winter. Manure should not be allowed to cake on the flanks and thighs as so often happens with cows that are not groomed regularly, especially when they are confined in poorly constructed stalls with little bedding.

Most dairymen intend to have their cows freshen at about 12-month intervals and to have them dry for a month or 6 weeks before freshening. Ordinarily, this practice results in a greater yield of milk than a longer interval between calvings.

In milking see that the udder and flanks of the cow are free of any dirt that may drop into the milk pail. If necessary, wash any soiled parts. Wiping the udder and flanks with a damp cloth may be sufficient. Milk only with clean, dry hands. Use a small-top pail, milk with both hands, and draw the milk quickly with as little discomfort to the cow as possible. The finger nails should be kept short. Milk tubes or straws should not be inserted in the teats.

CARE OF THE MILK

As soon as the milk is drawn it should be strained and then cooled by being set in cold water. When it is cool, a portion of it may be placed in milk bottles and kept in the refrigerator or other cool

place until used. The portion not needed for immediate use or for use as whole milk may be placed in a can or other container having a small diameter but relatively deep, for the cream to rise. In 24 hours the cream may be skimmed off for buttermaking, and the skim milk may be used on the table, for cooking, for cottage cheese, or it may be fed to the poultry.

All milk utensils, strainer cloths, etc., should be washed with warm water and baking soda or washing powder and then rinsed with boiling water every time they are used. After scalding, put them in a clean, airy place to dry out, but protect them from dust, flies, and other contamination. Exposure to sunshine will help keep the utensils sweet. Pails and cans should have rounded joints and soldered seams so there will be no crevices in which milk can lodge and cause spoilage.

MAKING BUTTER AND CHEESE AT HOME

When the quantity of cream obtained each day is small, it may be accumulated for 3 or 4 days and churned at one time, but it should be kept cold to prevent it from getting too sour. Butter made from cream that is too old or too sour has a strong flavor and does not keep well. Clean-flavored cream that is sweet or mildly sour may be made into high-quality butter. It should be churned at a temperature that will cause butter to form in firm granules. This temperature depends on the season of the year and other factors but is usually between 54° and 58° F. in summer and between 58° and 64° in winter. The butter should be washed when in the granular condition in order to remove as much buttermilk as possible. After the wash water has drained off salt should be added at the rate of one-half to three-fourths of an ounce to each pound of butter and the butter then worked until there is a thorough and even distribution of salt. Too much working, however, or working the butter when very soft, produces a sticky, salvy body and a dull appearance. Properly worked butter has a waxy body and a bright appearance.

MILK GOATS

The small-farm operator, especially when the family is small, may find it more economical and convenient to obtain his milk supply from 1 or 2 milk goats than to buy milk or to attempt to keep a cow. With proper care and feed, a good milk goat will produce from 1 to 1½ quarts of milk daily for from 7 to 10 months. Two goats, if bred to freshen at different seasons, should produce a regular supply of milk sufficient for a family of 3 or 4 persons. In localities where goats are raised prices commonly range from \$5 to \$25 or more, depending on the breeding and production records. Goats from unusually good strains sometimes are valued in excess of \$100. It is a good plan to purchase goats as near home as possible in order to keep transportation costs down to a minimum. Sometimes it is possible to rent goats.

Goats kept for milk production do well on feeds that are used for milk cows. Ordinarily one milk goat, or doe, as she is commonly called, will require from one-eighth to one-sixth as much feed as is required by a cow. The home garden should furnish much feed

suitable for a goat, such as vegetable tops, pea vines, and corn stover. There is usually an abundance of grass or other vegetation along fence rows that may be utilized by a goat and almost any member of the family can attend to the milking and tethering the animal where it can get feed.

Goats' milk is nearly always pure white in color. The small size of the fat globules is one of its chief characteristics. The cream rises very slowly and never so thoroughly as in the case of cows' milk. This condition makes impracticable the ordinary method of obtaining cream by allowing it to rise, but cream from goats' milk may be obtained with a cream separator.

Goats are easily housed as they require only shelter enough to protect them from wind, rain, and snow. Goats are natural climbers and if given an opportunity will climb on low sheds, farm machinery, and even automobiles left in the yard. The does come in heat regularly between September and March, after which they ordinarily cannot be bred until late in August. They usually remain in heat from 1 to 2 days and the period between heats varies from 5 to 21 days. The gestation period, the time elapsing between service and the birth of young, averages 149 days or about 5 months. Does usually give birth to 2 kids, but some does may have 3 or even 4.

FEEDING FOR MILK PRODUCTION

When the does are producing milk, feed them all the roughage they will consume, such as clover, alfalfa, mixed hay, or corn stover. Give them a liberal supply of such roots as turnips, mangels, carrots, or parsnips. Silage is also relished by goats and may be fed instead of roots. Though it would not be feasible to put up silage merely for a few animals, arrangements can sometimes be made to purchase small quantities of this feed from nearby farmers who have silos. The grain feeds best suited for milk goats are corn, oats, bran, barley, and linseed meal. Other suitable feeds are beet pulp, corn bran, cottonseed meal, and brewers' grains. Goats also relish browse of underbrush, but such feed alone is not conducive to good milk production.

A good ration that has proved to be very satisfactory for does in milk during the winter season consists of 2 pounds of alfalfa or clover hay, $1\frac{1}{2}$ pounds of roots (carrots, turnips, etc.), and from 1 to 2 pounds of grain. The grain mixture consists of 100 pounds of corn, 100 pounds of oats, 50 pounds of bran, and 25 pounds of linseed meal. When the does are on pasture feed them from 1 to $1\frac{1}{2}$ pounds of grain per day of the mixture mentioned.

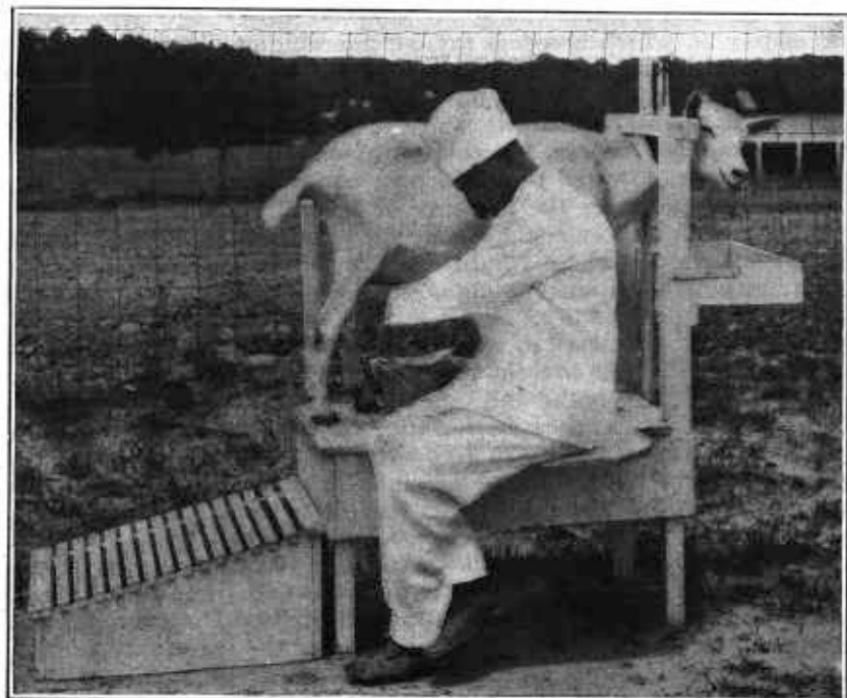
Contrary to popular opinion, cleanliness is essential in feeding goats. They seldom eat paper or trash, and they cannot thrive or be productive unless given an adequate quantity of good, wholesome feed. Make their rations from the best feeds available and those most relished by the goats. Keep plenty of rock salt before them and mix a small quantity of fine salt occasionally with the grain. A good supply of fresh water is necessary; goats should not be compelled to drink from stagnant pools.

Female goats kept in clean surroundings are not objectionable because of goat odor, this condition occurring principally in bucks.

Feed pregnant does all the roughage they will consume during the fall and early winter, together with 1 pound of roots or silage and one-half to 1 pound of grain of the same mixture as that fed to does in milk. Take special care to see that silage, if fed to does, is of good quality. Never feed silage that is frozen or moldy. Feed turnips, silage, or any other highly flavored feeds after milking; remove from the feed box any feed not consumed. Pregnant does require plenty of exercise to produce strong, healthy kids.

A mature doe which has good pasture during the crop season will eat about 300 pounds of hay and 450 pounds of grain a year.

The lactation period, which is the time that a doe produces milk, varies considerably in the different breeds and types of goats. It ranges all the way from 3 to 10 months, or even longer. A lactation period ranging from 7 to 10 months is considered very satisfactory. A thrifty and properly fed doe that gives milk less than 6 months should not be kept.



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FIGURE 10.—Milking stand and method of milking a goat. Such a stand may be built at small cost.

MILKING A GOAT

In milking a goat it is more convenient to use a stand with a stanchion at one end and a seat for the milker at one side. As young does usually object at first to being milked, the stanchion arrangement shown in figure 10 is an excellent method of handling them. For the first few times at least it is best to give the does a little grain feed in the box attached to the stanchion. Does soon become accus-

tomed to being milked and after a few times will jump upon the stand and put their heads through the stanchion without being assisted. It may be necessary to milk a heavy producer three times a day for a short time, but twice is sufficient for most does.

RAISING THE KIDS

The question of raising the kids is especially important to the family on a small tract where green feed is limited and the milk is needed for home use. Anyone who does not care to raise the kids may dispose of them when a few days old. Kids that are allowed to suck their dams not only make good growth but require very little attention as compared with those raised by hand.

It is not difficult to raise kids by hand with either goats' milk or cows' milk, but in any case it is best to allow the kids to remain with the doe for 2 days. This gives them an opportunity to obtain the colostrum milk which is so valuable for them.

DISEASES OF GOATS

A matter on which breeders lay considerable emphasis is the fact that goats are rarely affected with tuberculosis. When confined to close quarters with cows that have tuberculosis, they may, however, contract the disease. Goats that are in good condition are not very liable to contract disease, but there are some maladies which affect them if they are allowed to get in poor condition.

Emaciation indicates the presence of several abnormal conditions or diseases such as stomach worms, tapeworms, other internal parasites, or abortion. These conditions are best treated by a veterinarian, although minor ailments, such as the following, may be treated by the goat owner.

Caked udder, or mastitis, should be looked after very carefully. When this condition is present the udder feels hard and is hot. The best treatment is to bathe the udder thoroughly with warm water several times a day and after thorough drying with a cloth rub on a little lard. It is well also to give a dose of Epsom salts.

Goats that are not properly managed may become affected with foot rot. The first evidence of this trouble to attract attention is a slight lameness, which rapidly becomes more marked. The foot will become swollen and warm to the touch. In treating, first trim the affected foot thoroughly so as to expose the seat of infection, then soak in a saturated solution of copper sulphate. Pine tar applied to the parts is useful to promote healing after the infection has been controlled.

GENERAL POINTERS REGARDING LIVESTOCK

The keeping of livestock enables the farm operator to supply his home with meat and other livestock products at comparatively low costs.

Livestock also make it possible to utilize roughage and other feeds that might otherwise be wasted.

Although the care of livestock is confining and entails considerable work on the part of the owners, the effort is often well worth while since anyone who works for his own animals is working for himself.